Determining the most clinically and cost-effective way of implementing digital mammography services for breast screening in NHSScotland
Determing the most clinically and cost-effective way of implementing digital mammography services for breast screening in NHSScotland

Purpose of this document

NHS Quality Improvement Scotland (NHS QIS) has issued advice to NHSScotland on implementing digital mammography for breast screening.

The breast cancer screening programme in Scotland offers women aged 50–70 years a routine X-ray test, known as a mammogram, to detect possible breast cancer. Recent advancements in technology mean that these X-rays can be taken with new ‘digital’ machines. NHS QIS was asked to look at ways of introducing digital mammography for breast screening in Scotland that would offer most value for money.

We have made recommendations about the preparations which the Scottish Breast Screening Programme will need to make to roll out the new technology.

This booklet has been produced to explain our advice on the introduction of digital mammography to people who do not have specialist knowledge in this area.

It explains what digital mammography is, what the changes to the service will mean, how we formed our advice and the evidence we considered.

The full evidence is discussed in detail in our report called Health Technology Assessment 10: Determining the most clinically and cost-effective way of implementing digital mammography services for breast screening in NHSScotland. Copies of the report are available from NHS QIS and on our website, www.nhshealthquality.org

The words in bold are explained in the Glossary at the end of this document.
What is breast screening?

Breast cancer is the most common cancer in women. Early detection and treatment reduces the number of deaths caused by the disease. Breast screening aims to detect breast cancer in women before symptoms develop to allow treatment when it is most likely to be effective.

There are six breast screening centres in Scotland. Women are invited to attend a specialised screening unit, either in a hospital, in a community location or a mobile unit (a specially adapted van which can be parked in a convenient location such as a shopping centre).

What is digital mammography?

Mammography is the process used in breast screening to take pictures of a woman’s breast so that any abnormalities can be identified. The picture is taken using a type of radiation called an X-ray. In conventional mammography, the pictures are recorded on a film in a cassette. Digital mammography converts the X-rays to digital images which can be viewed on a computer screen and stored electronically rather than transferred to film.

NHS QIS considered the two main types of digital mammography, called computed radiography and direct digital radiography.
What we have recommended

The best method of digital mammography still needs to be determined. We have advised that a working group is formed to decide whether to use computed radiography, direct digital radiography or a combination of both. This group should also agree the timescale for introducing the technology across the NHS in Scotland and make practical arrangements for this roll out.

We have advised that a study is set up as soon as possible to test digital mammography equipment. The study should first test the equipment in a mobile screening unit. This will make sure that the equipment can work in Scottish weather and that using the equipment on mobile vans does not damage it. The study should then be widened to include all mobile and fixed screening units in one of the six Scottish screening centres.

The X-ray pictures will need to be stored electronically and the images shared between health professionals. We have advised that an electronic archive system, called a Picture Archiving and Communications System (PACS), should be in place to support digital mammography.

We have advised that the PACS is linked to a Breast Screening Information System (BSIS) that will fulfil administrative functions, such as inviting women for screening and recording screening results.

We have advised that equipment should be used as much as possible to provide greatest value for money. In some places this could be done by extending the hours during which screening appointments take place, for example by offering evening appointments.

We have advised that all equipment should comply with relevant international standards and that repairs should be carried out immediately when needed so that the screening service is not disrupted.

We have advised that there are likely to be changes in the roles performed and hours worked by staff, and that training will be necessary.
How we formed our advice

We used an internationally recognised process called Health Technology Assessment to form our advice. The assessment took account of the social, ethical, medical and economic implications of introducing digital mammography for breast screening in Scotland.

It brought together:

- scientific evidence (eg journal articles)
- expertise of healthcare professionals
- needs and preferences of women who attend breast screening, while considering the way NHSScotland is organised and how patients are currently managed.

We spoke to doctors, radiologists, radiographers, screening co-ordinators and scientists to consider all the evidence. The evidence was recorded in a consultation report that we published. Comments received during consultation were published on the web and taken account of in our scientific document, the Health Technology Assessment report.
Evidence used

We use the word ‘evidence’ to include information collected from a variety of sources, and we use different types of evidence to answer different types of questions. For example:

• Clinical effectiveness

How effective is digital mammography compared with conventional mammography? What should be done with X-ray images taken before digital mammography was available?

Evidence came from journal articles and national standards.

• Cost and benefits

Is digital mammography cost effective compared with conventional mammography?

Evidence came from a recent review of the literature and from healthcare professionals and manufacturers.

• Organisational issues

What are the options for implementing digital mammography? What are the specific organisational issues?

Evidence came from studies, expert opinion and experience from breast screening services elsewhere in the United Kingdom (UK).

• Issues for patients

How acceptable are the service changes that may arise from implementing digital mammography likely to be to women attending for screening?

Evidence came from journal articles and patient websites.
The following diagram is an example of how all four types of evidence came together to help form our Advice.

Clinical effectiveness

The performance of digital mammography is similar to conventional mammography. The performance, quality of image produced and radiation dose used meet the required standards.

Costs and benefits

The costs of digital mammography are high compared with conventional mammography. To help ensure that it provides value for money, equipment should be used as much as possible. Benefits include possibly increasing the efficiency of the screening service.

Advice

A study should be set up to test digital mammography equipment. The study should be on a mobile screening unit at first. The data collected from this study will help a group of experts, with input from service users, to decide how best to roll out the technology across the NHS in Scotland.

Organisational issues

Implementing digital mammography will be a complex process. Several technical issues will have to be addressed before digital mammography can be used. Staff roles are likely to change and flexible working hours may be adopted.

Issues for patients

It is likely that women will find digital mammography to be similar to conventional mammography. Women are less likely to be called back for a repeat mammogram due to technical reasons with digital mammography. Some digital technologies use a lower dose of radiation than conventional mammography. Digital mammography may allow staff more opportunities to interact with women during appointments.
Source of support and information

Further information about breast screening is available from http://www.nsd.scot.nhs.uk/services/sbsp/inforesources.html.

The NHS QIS scientific report, *Health Technology Assessment 10: Determining the most clinically and cost-effective way of implementing digital mammography services for breast screening in NHSScotland*, is available from NHS QIS or its website, www.nhshealthquality.org
## Glossary

**Advice**
Evidence-based recommendations made by NHS QIS about any aspect of healthcare including medicines, devices, clinical procedures, and healthcare settings. NHS boards and health professionals are expected to take account of NHS QIS Advice when making decisions about services for patients.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer</td>
<td>A growth of abnormal cells within the breast.</td>
</tr>
<tr>
<td>Breast Screening Information System (BSIS)</td>
<td>A computerised system which contains facilities for administration, data entry and compilation of statistics.</td>
</tr>
<tr>
<td>Clinical effectiveness</td>
<td>The evaluation of benefit against risk, in a standard clinical setting, using outcomes of importance to the patient.</td>
</tr>
<tr>
<td>Computed radiography (CR)</td>
<td>A type of digital mammography.</td>
</tr>
<tr>
<td>Digital mammography</td>
<td>A method of taking X-ray pictures of the breast. The X-rays are converted to digital images which can be viewed on a computer screen.</td>
</tr>
<tr>
<td>Direct digital radiography (DDR)</td>
<td>A type of digital mammography.</td>
</tr>
<tr>
<td>Health technology</td>
<td>An intervention used to promote health; prevent, diagnose or treat disease; or provide rehabilitation or long-term care. This includes medicines, devices, clinical procedures and healthcare settings.</td>
</tr>
<tr>
<td>NHSScotland</td>
<td>The National Health Service in Scotland</td>
</tr>
<tr>
<td>Mammogram</td>
<td>An X-ray picture of the breast.</td>
</tr>
</tbody>
</table>
## Mobile screening unit
A specially adapted van in which breast screening can be carried out locally.

## Picture Archiving and Communications System (PACS)
A computerised system on which digital images are stored and retrieved.

## Radiographer
A person who is trained in the technique of taking X-ray images of parts of the body.

## Radiologist
A doctor who specialises in diagnosing disease by means of X-rays and other imaging methods.

## Screening centres
Breast screening appointments in Scotland take place in one of six regional screening centres or associated mobile units.

## X-ray
A technique that uses beams of energy to take images of inside the body in order to help detect or diagnose various conditions. This is the most common imaging technique used in clinical practice worldwide.
NHS Quality Improvement Scotland

Our role is to improve the quality of healthcare in Scotland. We provide clear, authoritative advice on effective clinical practice, set national standards and monitor and publish reports on performance. We also advise on health interventions that are value for money, produce clinical guidelines and support the implementation of clinical governance. To advise on value for money, we must balance how well a treatment works with how much it costs.

Feedback

Understanding our advice aims to explain the work of NHS QIS in a way that everyone can understand. We would warmly welcome feedback on this brochure. For example, have we clearly explained our advice on introducing digital mammography for breast screening in Scotland and do you have any questions about our advice that were not answered here? Please give feedback to Helen Brown, Senior Statistician, NHS Quality Improvement Scotland, Delta House, 50 West Nile Street, Glasgow G1 2NP, tel. 0141 241 4303, email: helen.brown4@nhs.net

© NHS Quality Improvement Scotland, 2008

ISBN 1-84404-892-2

First published March 2008
NHS Quality Improvement Scotland consents to the photocopying, electronic reproduction by ‘uploading’ or ‘downloading’ from the website, retransmission, or other copying of this document for the purpose of implementation in NHSScotland and educational and ‘not for profit’ purposes. No reproduction by or for commercial organisations is permitted without the express written permission of NHS Quality Improvement Scotland.
You can look at this document on our website. It is also available, if you ask:

- in electronic format
- in audio cassette
- in Braille
- in large print
- in community languages.

NHS Quality Improvement Scotland

_Glasgow Office_ - Delta House 50 West Nile Street Glasgow G1 2NP  Tel 0141 225 6999

_Edinburgh Office_ - Elliott House 8-10 Hillside Crescent Edinburgh EH7 5EA  Tel 0131 623 4300

Email: comments@nhshealthquality.org  Website: www.nhshealthquality.org

ℹ️ This document is produced from elemental chlorine-free material and 🌳 is sourced from sustainable forests